E-03

Direct Observation of Tribological Behaviors of Materials

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Although the relative motion of two bodies in contact involves a number of forces across the interface influencing the nature of sliding and wear, frictional forces play a central role in everyday experience as it was in ancient times. The understanding and evaluation of friction, especially atomic-scale friction, remains a challenge. It is suggested that defects motion mainly contributes frictional force at defective surface. On the other hand, the destruction of crystalline structure dominates the frictional process at the surface of a single crystal. Last but not least, we also present direct evidence of tribological recrystallization [1] and grain growth in a polycrystalline gold thin film induced.

The friction here is studied by observing the structure change driven by sliding of the probe in combination with an applied load of a nanoprobe. In this study, a Nanofactory AFM-TEM holder is used in a transmission electron microscope (TEM) system.

1. Y. Liao, S. K. EswaraMoorthy, and L. D. Marks, *Philosophical Magazine Letters*, 1–5, (2010), (DOI: 10.1080/09500830903571384).

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